CLAIMS:

1. A zoom optical system comprising a lens system which is arranged to provide a variable zoom setting for a beam of radiation, wherein the lens system comprises a switchable optical element having a first mode and a second mode, characterised in that the element includes a first fluid, a second fluid and a wavefront modifier having a part through which said radiation beam is arranged to pass, wherein

in the first mode the switchable optical element has a first fluid configuration in which said part is substantially covered by the first fluid, and

in the second mode the switchable optical element has a second, different, fluid configuration in which said part is substantially covered by the second fluid

2. A zoom optical system according to claim 1, wherein the first fluid is a liquid and the second fluid is gaseous.

3. A zoom optical system according to any preceding claim, wherein the switchable optical element comprises a common first fluid electrode, a second, different, fluid electrode and a third, different, fluid electrode, wherein

in the first fluid configuration the element is arranged to provide switchable electrowetting forces by applying a first voltage across said first and second fluid electrodes, and

in the second fluid configuration the element is arranged to provide different switchable electrowetting forces by applying a second, different, voltage across said first and third fluid electrodes.

4. A zoom optical system according to any preceding claim, wherein the switchable optical element comprises a further wavefront modifier having a different part through which said radiation beam is arranged to pass, wherein

the wavefront modifier is adapted to perform a first wavefront modification and the further wavefront modifier is adapted to perform a second, different, wavefront modification which is arranged to complement the first wavefront modification.

5. A zoom optical system according to any preceding claim, wherein the wavefront modifier has a face, wherein said face is substantially spherical or aspherical, and said part is on said face.

6. A zoom optical system according to any preceding claim, wherein said first lens is a fluid meniscus lens which comprises different fluids separated by a fluid meniscus having a curvature,

wherein the optical system further comprises a control system and the variable focus comprises variations in the fluid meniscus curvature, wherein the control system is arranged to control the variable focus using meniscus electrowetting forces.

7. A zoom optical system according to claim 6, wherein the fluid meniscus lens further comprises a first electrode and a second, different, electrode and the control system is arranged to apply a voltage across said first and second meniscus electrodes to provide said meniscus electrowetting forces.

8. A zoom optical system according to any of claims 1 to 5, wherein the lens system comprises a solid lens capable of being arranged at varying spatial positions relative to the switchable optical element.

9. A zoom optical system according to any of claims 1 to 5, wherein said lens system comprises a liquid crystal lens having a varying optical power.

10. Image capturing apparatus comprising a zoom optical system according to any preceding claim, wherein with the optical system being in said first mode, the apparatus is adapted to capture an image with a first zoom setting, and with the optical system being in said second mode, said apparatus is adapted to capture an image with a second, different, zoom setting.

11. Image capturing apparatus according to claim 10, wherein said image capturing apparatus further comprises a digital zoom system arranged to introduce a digital zoom factor to an image captured in the first mode and/or an image captured in the second mode.